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ABSTRACT

This report is a follow-up to the first publication of the Child Proofing Our Communities Campaign, titled "Poisoned Schools: Invisible Threats, Visible Actions." The previous report looked at the problems of public schools built on contaminated land years ago, the trend of proposing new schools on contaminated land, and the threat of toxic pesticide use in schools. The current report addresses the need for protective laws concerning building new schools. It presents data from five states (California, Massachusetts, Michigan, New Jersey, and New York) on the number of schools located on or near hazardous chemical waste sites or other contaminated sites. It describes children's special vulnerabilities, the school siting process, and examples of schools built on or near contaminated land. Based on its findings, the report calls for state laws to ensure that the locations for new schools are safe and that contaminated property is properly cleaned up. It provides model school siting legislation for use in drafting legislation on the state level and for local school policies. The report also outlines action steps that parents can take to ensure that their children are not placed in harm's way. (Appendices contain the New York State recommended soil cleanup objectives for chemicals commonly found at contaminated sites, and the research methodology. Contains 36 references.) (EV)

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# Creating Safe Learning Zones:

## INVISIBLE THREATS, VISIBLE ACTION

ED 463 634

EF 006 062

A REPORT OF THE
CHILD PROOFING OUR
COMMUNITIES CAMPAIGN

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# Creating Safe Learning Zones: Invisible Threats, Visible Actions

This report is a joint effort of member organizations of the Child Proofing Our Communities Campaign: School Siting Committee, a locally-based, nationally-connected campaign to protect children from exposures to environmental health hazards in or near public schools.

Grants from the CS Fund/Warsh-Mott Legacy, Educational Foundation of America, Mitchell Kapor Foundation, New York Community Trust, Wallace Genetic Foundation, and the Winslow Foundation fund the campaign. The Center for Health, Environment and Justice provides coordination.

## Acknowledgements

The many individuals devoted to children's environmental health who have contributed to this report have our deep appreciation. We especially want to thank those organizations who contributed substantial research to this report. Lois Gibbs, community leader at Love Canal, provided the overall vision and inspiration for the Child Proofing Our Communities Campaign and for this report. We are especially indebted to Bobbie Chase from the Citizens' Environmental Coalition in Albany, New York, who worked tirelessly to research the data and develop the maps for the five states.

We also want to thank Joanna El-Hajj (Arab Center for Economic and Social Services), Teresa Mills (Buckeye Environmental Network), Susan Lee and Teresa Olle (California Public Interest Research Group), Cathy Lundquist (Cedar Hill School Environmental Health Committee), Stephen Lester, Marian Maralit, Ron Nicosia (Center For Heath, Environment and Justice), Daniel Swartz and Nsedu Obot (Children's Environmental Health Network), Anne Rabe (Citizens' Environmental Coalition), Dr. Mark Mitchell (Connecticut Coalition for Environmental Justice), Roshani Deraniyagale and Michelle Shewmaker (Detroiters Working for Environmental Justice), Mary Beth Doyle and Tracey Easthope (Ecology Center), Aliki Moncrief (Legal Environmental Assistance Foundation), Robina Suwol (Los Angeles Safe Schools), Tolle Graham (Massachusetts Coalition for Occupational Safety and Health), Wendi Tilden (Michigan Environmental Council), Rick Engler (New Jersey Work Environmental Group), Jane Nogaki (New Jersey Environmental Federation), Pam Hadad-Hurst (New York Coalition for Alternatives to Pesticides), Martha Arguello (Physicians for Social Responsibility, Los Angeles Chapter), Megan Owens (Public Interest Research Group in Michigan), Steve Fischbach (Rhode Island Legal Services), David Holz (Sierra Club, Mackinak Chapter), Billie Hickey (Southwest Detroit Environmental Vision), Alma Lowry (Sugar Law Center), Bernadette Del Chiaro and Sherry Ayres (Toxics Action Center), Lynn Rose (Western Massachusetts Coalition for Occupational Safety and Health).

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*Creating Safe Learning Zones* contains excerpts from *Poisoned Schools: Invisible Threats, Visible Actions*. We want to again express our gratitude to all who contributed to the success of that report.

For more information or to order copies of the report contact:

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# EXECUTIVE SUMMARY

Children are powerless against many dangers in school and out, and they look to adults for protection. However, decisions that adults make on a daily basis frequently imperil our nation's children. New schools are being built on or near chemically-contaminated land or near industrial facilities with toxic emissions that contaminate children's air, water, land, and food supply.

There is growing evidence that these chemical exposures—these invisible threats—diminish the health and intellect of our children. Research has revealed increasing numbers of children afflicted with asthma, cancers, lower IQs, and learning disabilities that impede their ability to develop their full potential. From birth, children are exposed to toxic chemicals in many ways that contribute to this increased incidence of disease. Public schools built on or near contaminated land are one potential source of chemical exposure.

Children are especially vulnerable to exposure to toxic chemicals. During a critical period of their growth and development, children spend a large part of their day at school. To needlessly place them in settings that heighten their risk of disease or hyperactivity or lower IQ is therefore irresponsible, especially in light of recent health statistics that document increased incidence of childhood cancer and disease.

While laws compel children to attend school, there are—astoundingly—no guidelines or laws in place that compel school districts to locate school buildings on property that will protect the school population from environmental health and safety risks. California is the only state that has some regulations and an assessment process for the building of new schools. Consequently, parents are forced to send their children to some schools that pose a threat to their children's health and abilities to learn.

This report is the outcome of a nationwide effort to eliminate practices that place children at risk from chemicals in their environment—particularly schools, parks, and playgrounds. The Child Proofing Our Communities Campaign is the beginning of a long-term collaborative venture among many groups concerned about children's environmental health to eliminate, where possible, chemical exposure in schools and our communities and to provide a safe and healthy environment to learn and play.

*Creating Safe Learning Zones* is a follow-up to the campaign's first publication, released in March 2001, *Poisoned Schools: Invisible Threats, Visible Actions. Poisoned Schools* looked at the problems of public schools that were built on contaminated land years ago, the trend of proposing new schools on contaminated land, and the threat of toxic pesticide use in schools.

*Creating Safe Learning Zones* was prepared by the School Siting Committee of the Child Proofing Our Communities Campaign. The report addresses the need for protective laws around building new schools. In the *Poisoned Schools* report, the campaign identified many schools that were built on or near a toxic or hazardous waste site. We also found that by 2003 school districts across the US propose to build an estimated 2,400 new schools. These findings raised two important questions:

1. How many schools are located on or near hazardous chemical waste sites or other contaminated sites today?

2. Is there a need for national or statewide legislation that would prohibit building a school on contaminated property or set cleanup guidelines when there is no alternative but to use contaminated property?

There was no state or federal agency that had this information or was willing to research these questions. Therefore, the Child Proofing Our Communities Campaign set out to find the answers.

**Table 1: Number of Public Schools and Students Attending Classes Within a Half-Mile of a Superfund or State-Identified Contaminated Site**

| State | Number of Schools | Number of Counties | Estimated Number of Students | Lists Used to Identify Toxic Sites |
|---|---|---|---|---|
| California | 43 | 11 | 32,865 | Superfund only |
| Massachusetts | 818 | 13 | 407,229 | Superfund & State |
| Michigan | 63 | 26 | 20,899 | Superfund & State |
| New Jersey | 36 | 11 | 18,200 | Superfund only |
| New York | 235 | 39 | 142,738 | Superfund & State |
| **Total** | **1,195** | **100** | **621,931** | |

The campaign selected five states for investigation – California, Massachusetts, Michigan, New Jersey, and New York. For California, Massachusetts, Michigan, and New Jersey, public schools were identified using data from the US Department of Education. For New York, data from the New York State Education Department were used. Private schools are not addressed in this report because of the lack of a central database for these schools.

To locate contaminated sites, the campaign used the list of federal Superfund sites (National Priorities List). For Massachusetts, Michigan, and New York the campaign also used state hazardous waste site lists. The Massachusetts list is based on broader criteria for determining contaminated sites, which accounts for the higher number of contaminated sites identified by the campaign for that state. For the remaining two states, California and New Jersey, only sites on the federal Superfund list have been included. (A more detailed description of the methods used to locate schools within a half-mile of Superfund and state-identified contaminated sites can be found in Appendix B.)

Superfund sites were chosen because they represent the nation's worst contaminated sites. These are the sites that the EPA has determined pose the greatest long-term risk to public health and the environment. Sites considered for Superfund designation are investigated by the EPA and ranked according to such factors as the toxicity of the substances found there and the likelihood that contaminants have been released into the environment.

The campaign chose to use a half-mile radius as the cut-off in defining whether a school was "on or near" a federal- or state-identified hazardous waste site. This distance was chosen because in most school districts, children living less than a mile from the school generally walk to and from their school every day.

The findings are very alarming. In the five states that we looked at, there are over 1,100 public schools within a half-mile radius of a known contaminated site. Within these states, over six hundred thousand children attend classes in schools near contaminated land. These findings are summarized in Table 1.

The schools located within a half-mile of a federal Superfund or state-identified contaminated site are shown in a series of geographic statewide maps, which are included as attachments to the report.

For this report, the campaign researched the distance of schools from contaminated sites. We did *not* investigate individual schools to evaluate the health risk, if any, to school children and personnel at specific locations. The campaign takes a precautionary approach to protecting children's health. Because children are especially vulnerable to health damage from toxic chemicals, they may be at risk of serious harm when they attend schools built on or near contaminated sites.

This report summarizes the data from only five states. One can only guess at what the numbers would look like for all 50 states. Yet, we are aware of only one state in the entire country—California—that has laws that compel school administrators to investigate potentially contami-

nated property. Even California's laws, however, do not prevent use of contaminated property. In fact, there are more rules, regulations, zoning, and disclosure requirements today that apply to the acquisition of land to build a private home or commercial building than to building a public school.

If the problems were only limited to those schools built years ago when our knowledge of chemical exposures and human health risks was more limited, new laws would not be necessary. However, school districts continue to propose and build schools on or near contaminated land with little regard to the health and safety of students and school personnel. Five examples of schools recently built on or near contaminated property are described in this report.

Based on the findings of this report, we believe there is a critical need for state laws that ensure that the locations for new schools are safe and that contaminated property is properly cleaned up. For this report, the campaign has developed model school siting legislation to help local activists promote laws and policies (covering both public and private primary and secondary schools) that protect children's health. This model can be given to interested legislators for use in drafting legislation on the state level and to school boards for use in drafting local school policies. This report also outlines action steps that parents can take to ensure that their children are not placed in harm's way—in schools that pose unnecessary health risks.

We truly are at a critical juncture. Public elementary and secondary enrollment is rapidly growing and is expected to reach an all-time high of 44.4 million by the year 2006. At least 2,400 more schools are needed in the next few years to accommodate this increase. If action isn't taken immediately, these new schools will continue to be built without guidelines to protect children against chemical exposures. Failure to act would place tens of thousands of children at risk of being exposed to toxic chemicals at their place of learning. Society can no longer allow innocent children to be placed in harm's way due to inexcusably bad decisions by local school district decision makers.

# INTRODUCTION & FINDINGS

The Child Proofing Our Communities Campaign was established two years ago as part of a nationwide coalition of grassroots groups working on school-based environmental health issues. The campaign aims to connect local efforts across the country, raise awareness of toxic threats to children's health, and promote precautionary approaches most protective of children. The campaign consists of four school-focused committees: Siting, Pesticides, Indoor Air Quality, and Healthy Buildings.

We released our first publication in March 2001: *Poisoned Schools: Invisible Threats, Visible Actions*. This report called for state and local policy action on the use of toxic pesticides in and around schools and for laws that prohibit building schools on or near known toxic sites or releases. For urban communities where no other area is available, the report made recommendations concerning the cleanup of the site before building a school.

*Creating Safe Learning Zones* is a follow-up report of the Siting Committee of the Child Proofing Our Communities Campaign. The report addresses the need for protective laws around building new schools. In the *Poisoned Schools* report, the campaign identified many schools that were built on or near a toxic site. We also found that by 2003, school districts across the US propose to build approximately 2,400 new schools (USDE, 2000). These findings raised two important questions:

1. How many schools are located on or near hazardous chemical sites or other contaminated sites today?

2. Is there a need for national or statewide legislation that would prohibit building a school on contaminated property or set cleanup guidelines when there is no alternative but to use contaminated property?

Setting out to answer these questions, the campaign asked the federal Environmental Protection Agency's (EPA) Office of Children's Health to research the relationship between federal Superfund sites and public school buildings. The EPA explained that it did not have this information and refused to do the necessary research.

The campaign did not have the resources to investigate how close every public school in the country might be to a contaminated site. Consequently, we selected five states for investigation – California, Massachusetts, Michigan, New Jersey, and New York. For California, Massachusetts, Michigan, and New Jersey, public schools were identified using data from the US Department of Education (USDE, 2001). For New York, data from the New York State Education Department was used (NYED, 2001). Private

**Child Proofing Our Communities Campaign**
**School Siting Committee Goals**

- Ensure parent, teacher, student, and community right-to-know. This means involving them in decision-making processes about school siting and notifying them in advance of health hazards associated with contaminants on or near proposed or existing school property.

- Ensure that new schools are built on land that poses no unnecessary health risk to children from contaminated soil, air, or water releases.

- Ensure that contaminated school property is brought to standards protective of children. If cleanup is not possible, remove students, teachers, and staff from schools built on or near sources of contamination that pose serious public health risks.

schools are not addressed in this report because of the lack of a central database for these schools.

To locate contaminated sites, the campaign used the list of federal Superfund sites (National Priorities List). For Massachusetts, Michigan, and New York the campaign also used state hazardous waste site lists (MADEP, 2001; MIDNR, 2001; MIDEQ, 2001; NYDEC 2001). The Massachusetts list is based on broader criteria for determining contaminated sites, which accounts for the higher number of contaminated sites identified by the campaign for that state. For the remaining two states, California and New Jersey, only sites on the federal Superfund list have been included. (A more detailed description of the methods used to locate schools within a half-mile of Superfund and state-identified contaminated sites can be found in Appendix B.)

Superfund sites were chosen because they represent the nation's worst contaminated sites. These are the sites that the EPA has determined pose the greatest long-term risk to public health and the environment. Sites considered for Superfund designation are investigated by the EPA and ranked according to such factors as the toxicity of the substances found there and the likelihood that contaminants have been released into the environment.

The campaign chose to use a half-mile radius as the cut-off in defining whether a school was "on or near" a federal Superfund site or state-identified contaminated site. This distance was chosen because in most school districts, children living less than a mile from the school generally walk to and from their school every day.

**Findings**

The findings are very alarming. In the five states that we looked at, there are over 1,100 public schools within a half-mile radius of a known contaminated site. Within these states, over six hundred thousand children attend classes in schools near contaminated land.

The tables on the following pages indicate the number of public schools and students attending classes by county in each of the five states. For some states, we have included areas within counties.

For each state, the schools located within a half mile of a federal Superfund or state-identified contaminated site are shown in a series of geographic statewide maps, which are included as attachments to the report. To view county-level maps within each state, visit the Child Proofing Our Communities web site at www.childproofing.org.

**Table 1: Number of Public Schools and Students Attending Classes Within a Half-Mile of a Superfund or State-Identified Contaminated Site**

| State | Number of Schools | Number of Counties | Estimated Number of Students | Lists Used to Identify Toxic Sites |
|---|---|---|---|---|
| California | 43 | 11 | 32,865 | Superfund only |
| Massachusetts | 818 | 13 | 407,229 | Superfund & State |
| Michigan | 63 | 26 | 20,899 | Superfund & State |
| New Jersey | 36 | 11 | 18,200 | Superfund only |
| New York | 235 | 39 | 142,738 | Superfund & State |
| **Total** | **1,195** | **100** | **621,931** | |

**Table 2: Number of Public Schools and Students Attending Classes Within a Half-Mile of a Superfund or State-Identified Contaminated Site, By County—California**

| State | County | Type of Sites | Number of Schools within ½ mile | Number of Students |
|---|---|---|---|---|
| **California** | | | | |
| | Fresno | Superfund only | 1 | 628 |
| | Los Angeles | " | 15 | 14,349 |
| | Merced | " | 1 | 560 |
| | Orange | " | 2 | 1,130 |
| | Riverside | " | 1 | 1,259 |
| | Sacramento | " | 2 | 1,005 |
| | San Bernardino | " | 2 | 4,091 |
| | San Diego | " | 2 | 1,386 |
| | San Francisco | " | 3 | 1,153 |
| | Santa Clara | " | 11 | 6,609 |
| | Siskiyou | " | 3 | 695 |
| **Total** | | | **43** | **32,865** |

**Table 3: Number of Public Schools and Students Attending Classes Within a Half-Mile of a Superfund or State-Identified Contaminated Site , By County—Massachusetts**

| State | County | Type of Sites | Number of Schools within ½ mile | Number of Students |
|---|---|---|---|---|
| **Massachusetts** | | | | |
| | Barnstable | Superfund and State | 12 | 6,313 |
| | Berkshire | " | 18 | 8,091 |
| | Northern Bristol | " | 27 | 13,277 |
| | Southern Bristol | " | 41 | 14,886 |
| | Dukes | " | 1 | 460 |
| | Essex – Section 1 | " | 26 | 12,905 |
| | Essex – Section 2 | " | 24 | 12,958 |
| | Essex – Section 3 | " | 30 | 12,087 |
| | Essex – Section 4 | " | 26 | 13,392 |
| | Franklin | " | 7 | 2,354 |
| | Eastern Hampden | " | 48 | 24,978 |
| | Western Hampden | " | 19 | 8,030 |
| | Hampshire | " | 5 | 1,867 |
| | Middlesex – Section 1 | " | 41 | 21,011 |
| | Middlesex – Section 2 | " | 22 | 12,680 |
| | Middlesex – Section 3 | " | 20 | 10,033 |
| | Middlesex – Section 4 | " | 25 | 12,298 |
| | Middlesex - -Section 5 | " | 30 | 14,531 |
| | Middlesex – Section 6 | " | 36 | 20,141 |
| | Northern Norfolk | " | 18 | 10,343 |
| | Southern Norfolk | " | 23 | 11,506 |
| | Southwestern Norfolk | " | 33 | 16,634 |
| | Most of Plymouth | " | 33 | 17,814 |
| | Northwestern Corner of Plymouth | " | 29 | 16,548 |
| | Suffolk – Map 1 | " | 43 | 19,884 |
| | Suffolk – Map 2 | " | 29 | 14,312 |
| | Suffolk – Map 3 | " | 33 | 16,548 |
| | Suffolk – Map 4 | " | 29 | 17,321 |
| | Northern Worcester County | " | 23 | 9,371 |
| | Town of Worcester | " | 33 | 17,038 |
| | Southern Worcester County | " | 34 | 17,618 |
| **Total** | | | **818** | **407,229** |

One county in Michigan was left out of the chart. Clinton county has one school with a population of 100 students. Total number of schools in Michigan is 64 and total population of students is 20, 999.

**Table 4: Number of Public Schools and Students Attending Classes Within a Half-Mile of a Superfund or State-Identified Contaminated Site, By County—Michigan**

| State | County | Type of Sites | Number of Schools within ½ mile | Number of Students |
|---|---|---|---|---|
| **Michigan** | | | | |
| | Allegan | Superfund and State | 2 | 663 |
| | Alpena | " | 1 | 244 |
| | Bay | " | 2 | 139 |
| | Berrien | " | 6 | 828 |
| | Cass | " | 1 | 220 |
| | Charlevoix | " | 3 | 833 |
| | Chippewa | " | 1 | 229 |
| | Emmet | " | 1 | 252 |
| | Ingham | " | 5 | 1,344 |
| | Ionia | " | 3 | 1,233 |
| | Kalamazoo | " | 3 | 1,217 |
| | Kent | " | 4 | 2,995 |
| | Leelanau | " | 1 | 327 |
| | Lenawee | " | 1 | 122 |
| | Monroe | " | 1 | 745 |
| | Montcalm | " | 2 | 745 |
| | Montmorency | " | 2 | 639 |
| | Muskegon | " | 3 | 1,074 |
| | Newaygo | " | 2 | 1,061 |
| | Oakland | " | 1 | 336 |
| | Schoolcraft | " | 4 | 1,001 |
| | St. Joseph | " | 3 | 624 |
| | Van Buren | " | 3 | 1,165 |
| | Washtenaw | " | 2 | 453 |
| | Wayne | " | 5 | 2,119 |
| | Wexford | " | 1 | 291 |
| **Total** | | | **63** | **20,899** |

**Table 5: Number of Public Schools and Students Attending Classes Within a Half-Mile of a Superfund or State-Identified Contaminated Site, By County—New Jersey**

| State | County | Type of Sites | Number of Schools within ½ mile | Number of Students |
|---|---|---|---|---|
| **New Jersey** | | | | |
| | Atlantic | Superfund only | 1 | 540 |
| | Bergen | " | 9 | 3,723 |
| | Burlington | " | 2 | 808 |
| | Camden | " | 1 | 1,647 |
| | Cumberland | " | 2 | 203 |
| | Essex | " | 8 | 5,248 |
| | Hudson | " | 1 | 624 |
| | Middlesex | " | 2 | 799 |
| | Morris | " | 5 | 1,393 |
| | Ocean | " | 2 | 2,298 |
| | Somerset | " | 3 | 917 |
| **Total** | | | **36** | **18,200** |

**Table 6: Number of Public Schools and Students Attending Classes Within a Half-Mile of a Superfund or State-Identified Contaminated Site, By County—New York**

| State | County | Type of Sites | Number of Schools within ½ mile | Number of Students |
|---|---|---|---|---|
| **New York** | | | | |
| | Albany | Superfund and State | 4 | 1,990 |
| | Bronx | " | 4 | 2,101 |
| | Broome | " | 11 | 8,387 |
| | Cattaraugus | " | 2 | 748 |
| | Chautauqua | " | 5 | 2,928 |
| | Chemung | " | 6 | 3,836 |
| | Chenango | " | 3 | 1,853 |
| | Cortland | " | 5 | 2,702 |
| | Delaware | " | 3 | 1,248 |
| | Dutchess | " | 3 | 1,382 |
| | Erie | " | 13 | 8,334 |
| | Fulton | " | 2 | 530 |
| | Herkimer | " | 3 | 960 |
| | Jefferson | " | 1 | 190 |
| | Kings | " | 12 | 9,604 |
| | Monroe | " | 7 | 6,406 |
| | Nassau | " | 31 | 21,985 |
| | New York | " | 5 | 3,428 |
| | Niagara | " | 7 | 3,547 |
| | Oneida | " | 10 | 5,513 |
| | Onondaga | " | 6 | 2,823 |
| | Orange | " | 5 | 1,874 |
| | Orleans | " | 7 | 2,768 |
| | Queens | " | 14 | 8,587 |
| | Rensselaer | " | 1 | 151 |
| | Richmond | " | 4 | 3,933 |
| | Rockland | " | 4 | 3,012 |
| | Saratoga | " | 9 | 5,213 |
| | Schenectady | " | 4 | 1,421 |
| | Seneca | " | 1 | 121 |
| | Steuben | " | 1 | 213 |
| | Suffolk | " | 19 | 14,932 |
| | Sullivan | " | 1 | 306 |
| | Tioga | " | 2 | 1,181 |
| | Tompkins | " | 2 | 484 |
| | Ulster | " | 1 | 571 |
| | Washington | " | 2 | 889 |
| | Wayne | " | 1 | 442 |
| | Westchester | " | 14 | 6,145 |
| **Total** | | | **235** | **142,738** |

The average US public school is 42 years of age (USDE, 2000a). Nearly half of all schools lack the electrical wiring needed for today's computer systems (USDE, 2000). At the same time, schools show record enrollments (USDE, 2000a). To address this problem federal and state funding is being sought to provide billions of dollars for construction and renovation of public schools (USDE, 2000b).

As we reported in *Poisoned Schools*, because many school buildings are so old, some may be "unsafe or even harmful to children's health" (GAO, 1995). Over sixty percent of schools (many in otherwise adequate condition) reported at least one major building feature, such as plumbing, in disrepair, and about half told of at least one unsatisfactory environmental condition, such as poor ventilation or poor heating or a problem with lighting (GAO, 1995).

Forty years ago, when the typical public school was built, school boards did not understand the seriousness of the threat that chemical exposures posed to human health. Nor was there any understanding of the special vulnerabilities that children have to chemical exposures. After the Love Canal dumpsite crisis in Niagara Falls, New York, after the clusters of childhood leukemia in Woburn, Massachusetts, in Toms River, New Jersey, and other similar cases across the nation, we know better. Yet, school boards continue to ignore the scientific evidence and propose building public schools on or near contaminated land.

As a result, parents in communities across the US are shocked to find construction crews descending on or next to abandoned landfills, brownfields (abandoned industrial and commercial contaminated property), or heavily polluting industries to build schools (See sidebar). School districts, pressed to save money, are often enticed by donations of unknowingly contaminated property, seek out the cheapest land, or hire uncertified or poor-quality contractors to evaluate environmental risks, all at great risk to children. The poor and communities of color where children already suffer disproportionately from asthma, lead poisoning, and developmental disabilities, lose out most frequently.

There is no question about the need to build new schools and renovate existing buildings. Smaller class sizes and access to modern technology are critical to improving children's opportunity to learn. But so is minimizing health risks posed by unsafe school renovation, construction, and siting in contaminated areas. A child's right to a good education includes the freedom to learn in an environment that does not jeopardize health.

**Schools Continue to be Sited on Contaminated Property**

In Cumberland, Maine, the school board attempted to build an elementary school next to a garbage dump. There are no laws in Maine that make building public schools near contaminated land illegal. It was the hard work and persistence of the parents that forced the school board to retract their proposal.

The school board in Quincy, Massachusetts fought hard to build their new high school on an old industrial site that included very toxic chemicals. This land was once the site of a shipyard where waste including asbestos was dumped, and later was used as a steel mill. The Quincy parents fought back and stopped this proposal as well.

Parents in Providence Rhode Island, however, were not as successful and two of their schools were built next to a dumpsite. Parents in Houston, Texas also lost their fight and now have a middle and a high school located a chain-link fence away from five chemical plants, including Bayer and Goodyear.

## Children's Special Vulnerabilities

### Why the growing concern about children's exposure to environmental chemicals in and around schools?

During a critical period of their growth and development, children spend a large part of the day at school. To needlessly place them in settings that heighten risk of disease or hyperactivity or lower IQ is therefore irresponsible, especially in light of recent health statistics that document increased incidences of childhood cancer and disease. Groups such as the US Environmental Protection Agency (USEPA, 1998), the American Academy of Pediatrics (AAP, 1999), the National Academy of Sciences (NAS, 1993), Physicians for Social Responsibility (GBPSR, 2000), and the National Parents Teachers Association have echoed these health concerns about the environmental chemical exposures that children face. Although opinions vary about the causes of increases in childhood illnesses, all agree these increases are real and that society should take steps to prevent childhood exposure to unnecessary health risks.

### Rising Rates of Disease in Children

In recent years, researchers have gained far better understanding of children's special vulnerability to chemical exposure (Bearer, 1995; GBPSR, 2000; Landrigan, 1998). Scientists have found that, relative to adults, children require greater protection and that more research on children's responses to chemical exposure is critical. Researchers do not understand all of the interactions between chemical exposure and growing children, but the data clearly justify school and government action to protect children. The rising rate of childhood disease is indisputable.

- Asthma, afflicting nearly 8.6 million US children under 18 years of age (ALA, 2001), is the primary cause of school absenteeism and hospital admission among chronic conditions (ALA, 2001a).

Recent cancer statistics on children from the National Cancer Institute show that in children 0–4 years old the incidence of cancer increased dramatically between 1973 and 1995. There was a:

53% rise in brain and other nervous system cancers
37% rise in soft tissue cancer
32% rise in kidney and renal pelvis cancers
18% rise in acute lymphoid leukemia

These statistics also show a dramatic increase in the incidence of cancer in teenagers aged 15–19 during the same period. There was a:

128% rise in non-Hodgkin's lymphoma
78% rise in ovarian cancer
65% rise in testicular cancer
30% rise in bone and joint cancer
29% rise in thyroid cancer

Source: NCI, 1998

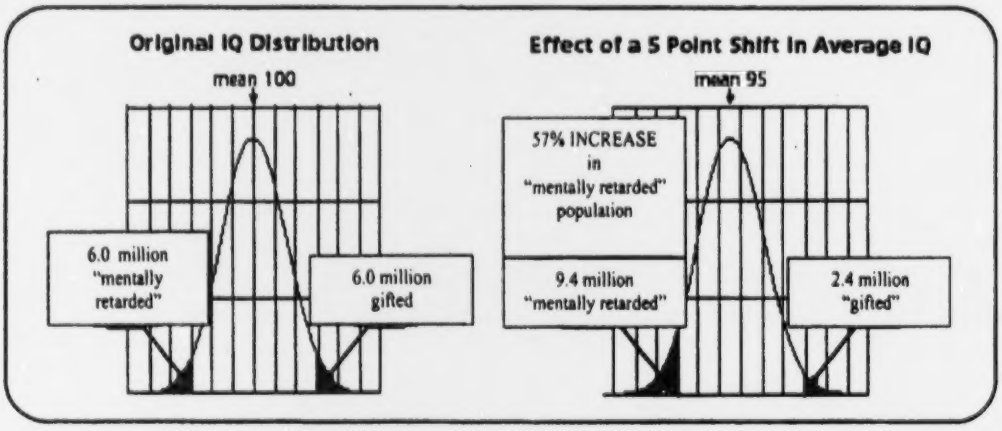
- Cancer is the number one disease-related cause of death in children (NCI, 1998). Approximately 8,600 US children—newborns to age 14—are diagnosed with cancer annually. The American Cancer Society estimated that 1,500 children under 15 would die from cancer in 2001 (ACS, 2001).

- Childhood learning disabilities, hyperactive behavior, and inability to maintain attention have also soared nationwide. The number of children in special education programs increased 191% from 1977 to 1994 (GBPSR, 2000).

- Conservative estimates are that attention deficit hyperactivity disorder (ADHD) affects 3–6% of all school-age children. Some researchers suggest a much higher rate, near 17% (Goldman, 1998).

- Autism appears to be skyrocketing. In California, childhood autism is thought to

**Figure 1**


Original IQ Distribution
mean 100
6.0 million "mentally retarded"
6.0 million gifted
Effect of a 5 Point Shift in Average IQ
mean 95
57% INCREASE in "mentally retarded" population
9.4 million "mentally retarded"
2.4 million "gifted"

have risen over 200% between 1987 and 1998 (CHHS, 1999).

- Some scientists believe many of these diseases and learning problems may be related to children's exposure to environmental chemicals in the womb or their everyday environment, including their school (GBPSR, 2000; Needleman, 1994).

These increases in disease and disability critically impact the present and future of our nation. Making our children sick or unable to develop their full intellectual potential could devastate future generations, the economy, and our quality of life.

The US mandates its schools to educate our children so that they can become vital contributors to society. Most definitely they are not commissioned to hamper children's intellectual development and health. Moreover, education not only is the foundation of a stable, just society but critical to national economic competitiveness. Continued rises in rates of learning disabilities, lower IQ scores, hyperactive behaviors, and more could imperil our nation's future economic base.

We live in a global world economy in which information increasingly figures as the currency of national wealth. Our nation's ultimate competitive resource is now the intellect, training, and creative capacity of citizens. Lacking these, we will be left behind.

As Timothy Wirth (2000) of the United Nations Foundation describes this circumstance, "In a society of 260 million people with an average IQ of 100, 2.3% of the population would have an IQ of less than 70.

That translates to 6 million people with IQ scores that define mental retardation. On the other end of the curve, 2.3% of the population would have IQ scores above 130. In other words, 6 million people would be categorized as 'gifted'" (Wirth, 2000).

A lowered average IQ of just 5 points—from 100 to 95—would shift the number of persons with low IQs dramatically. As the Figure 1 shows, the number of people with IQ scores in the range of mental retardation would increase 57%—from 6 to 9.4 million. Conversely, the number deemed "gifted" would drop 60%, from 6 to only 2.4 million (GBPSR, 2000).

The economics of these data is transparent. The social costs of caring for a larger fraction of the population classified as mentally retarded far exceed those of environmental protection. Using this same analysis, society loses the creativity and intellectual leadership of 60% of potentially "gifted" individuals such as Bill Gates, Steven Spielberg, or Tiger Woods.

This implies that the elimination of lead from gasoline and paint was perhaps one of the most significant education advances of the

twentieth century. Current research shows a 10-point drop in blood lead level means an average 2.8-point IQ gain. Blood lead level plunged 15 points after lead was removed from gasoline in the US (Weiss, 1997). This gives every baby born today a "gift" of four to five IQ points. Conservative calculations suggest each IQ point is worth about $8,300 in additional lifetime income. With about 4 million babies born annually, the elimination of lead has an economic value of over $100 billion per year for the lifetime income of those children (Wirth, 2000).

Schools are crucial for our children to succeed and our nation to compete. Clearly, for them to provide the education and training our children require, learning must occur in an environmentally safe place—one that supports, and most certainly does not impede, intellectual growth.

## What Makes Children Especially Vulnerable to Environmental Chemicals?

The special vulnerability of children to environmental chemicals demands that schools act to protect them.

### Children are not little adults.

Children are more often exposed to environmental threats than adults and more susceptible to environmental disease. This makes them highly vulnerable to chemical exposure. Of small size and still developing, they take in more food, drink, and air per pound of body weight. Also, children behave like children.

### Children are still developing and remain vulnerable through adolescence.

During prenatal development, infancy, and adolescence, children are growing and adding new tissue more rapidly than at any other period of their lives. Because their tissues and organ systems are still developing and mature at different rates, they are susceptible to environmental chemical influences over an extended time.

Children move through several stages of rapid growth and development. From conception to age seven, growth is most rapid. The ensuing years, through adolescence, bring continued growth, as crucial systems, such as the reproductive system, mature. Insulation of brain nerve fibers is not complete until adolescence. Similarly, air sacs in the lung, where oxygen enters the blood stream, increase in number until adolescence (Needleman, 1994).

During these critical years, as structures and vital connections develop, body systems are not suited to repair damage caused by toxins. Thus, if neurotoxins assault cells in the brain, immune system, or reproductive organs or if endocrine disruption diverts development, resulting dysfunction will likely be permanent and irreversible. Depending on the organ damaged, consequences can include lowered intelligence, immune dysfunction, or reproductive impairment (Landrigan, 1998).

### Children's immature systems are less able to handle toxins.

Because organ systems are still developing, children absorb, metabolize, detoxify, and excrete poisons differently from adults. In some instances, children are actually better able to deal with environmental toxins. More commonly, they are less able and thus much more vulnerable (Landrigan, 1998). For example, children absorb about 50 % of the lead to which they are exposed, while adults absorb only 10–15 %. Their less developed immune system is also more susceptible to bacteria such as strep, to ear infections, to viruses such as flu, and to chemical toxins (Needleman, 1994).

### Children eat more, drink more, and breathe more.

Children consume more calories, drink more

water, and breathe more air per pound of body weight than adults. Their body tissues more readily absorb many harmful substances and outside play heightens their exposure to environmental threats relative to adults.

US children ages one to five eat three to four times more per pound of body weight than the average adult. Infants and children drink more water on a body-weight basis and they take in more air. Differences in body proportions between children and adults means children have proportionately more skin exposure (NRC, 1993).

### Children behave like children.

Normal activities heighten children's vulnerability to environmental threats. Their natural curiosity, tendency to explore, and inclination to place their hands in their mouths often opens them to health risks adults readily avoid.

Young children crawl and play on the ground or floor and play outside. These natural proclivities expose them to contaminated dust and soil, pesticide residue, chemicals used to disinfect or clean, garden weed-killers, fertilizers, and other potentially hazardous substances.

Air pollution impacts children more because they are frequently outdoors and physically active. They thus breathe pollutants more directly and deeply into their lungs. Children's natural curiosity leads them to explore situations that could expose them to environmental hazards. For example, they may enter fenced-off areas or polluted creeks and streams (Bearer, 1995).

### Children have more time to develop disease.

Children's longer remaining life span provides more time for environmentally induced diseases to develop. Exposure to carcinogens during childhood, as opposed to adulthood, is of particular concern since cancer can take decades to develop (Landrigan, 1998).

## The School Siting Process

### Factors that Influence Where New Schools are Located

School districts chronically lack resources required to meet renovation and construction needs. Often pressure to reduce expenses and expedite the process encourages shortcuts. As a result, far too many schools are located on cheap land near or on contaminated property. This is not only a problem of the past, but one of our present and future.

The push to build new schools is complicated by the dearth of appropriate sites. In urban school districts, the need for schools is often greatest in densely populated neighborhoods that lack vacant land. Building new schools in these communities can mean condemning and clearing existing homes and businesses or siting schools on previously industrial property. In other instances, schools are built on cheap land far from the community served, in industrial or agricultural areas. Wealthy residential communities often deny sites for schools that would serve students of color or low income.

School siting is complex, involving many factors:

- Communities of color and low-income eagerly await new, technologically advanced schools with resources needed by their children since most of their schools are old and rundown, often with asbestos, lead, and mold problems. These schools lack resources for providing learning skills essential to compete in current and future job markets. Parents in these communities often face an unfair decision: accept siting on inexpensive contaminated land so that funds remain to procure needed technology, or build on expensive environmentally safer property, depleting funds for teaching resources.

- Teachers and administrators also prefer new schools, especially with fewer stu-

dents per classroom, new computers, and more resources for children and staff. They face the same dilemma: either cheap contaminated land with more resources or safer property with fewer resources.

- Urban areas face choices still more complex. Fairly clean areas are often green space for public parks or recreation. Citizens must ask whether using these areas for safely housing school children is more important.

- Often no investigation of past land use precedes construction, leaving discovery of chemical contamination until after resources are committed.

- Neighborhoods near industrial complexes and contaminated sites are hard pressed to site a "neighborhood" school out of harm's way. How can school grounds be "cleaner" than neighborhood homes subject to continuing contamination?

- Finally, no protective standards exist to guide school officials assessing "risk" to children when considering a site once used for industrial purposes or near an industrial complex.

## Failure of the Regulatory System and Science

Most of the public believe that government agencies and regulations adequately protect children's health at school or that some "authority" surely oversees school safety and takes great care to guard children from exposure to toxic chemicals. This assumption is often incorrect. Only a few very specific and limited laws and regulations are specifically designed to protect children—for example, regulation of asbestos in schools and lead in wall paint. A 1999 survey of New York State Education Department staff found that although the department is mandated to protect student health and safety, it does not require schools to employ school nurses; report student accidents, illness, or injury; or assign staff to help with environmental issues (HSN, 1999). Regulations alone are not the problem. Science has definite limits in determining children's health risks. In the case of school siting, there is little scientific evidence that can definitively link a child's exposure to chemicals from industrial contamination of school property to a specific health outcome. That does not mean no link exists but that the scientific tools that assess impact are too crude to provide certainty.

For example, in a small New York rural community, 24 students, 5 teachers, and 3 custodial workers have been diagnosed with cancer. All have attended or work at a public school sited on an old industrial site contaminated with cancer causing chemicals. However, because the population is small and information on how the chemicals affect growing children is lacking, an absolute cause and effect link cannot be proven.

The impact of chemicals on children is difficult to assess because of the lack of information and scientific research. Of an estimated 87,000 chemicals in use today, the majority lack basic toxicity testing (USEPA, 1998a). For those tested, important health effects are overlooked. An EPA review of 2,863 of the most commonly used chemicals found no toxicity information available for 43% and a complete set of toxicity data for only 7% (USEPA, 1998b). Toxicity refers to whether a chemical can cause harm. Currently, much attention is given to whether a chemical can cause cancer. Other important health effects, such as impairment of the immune, hormone, reproductive, or nervous systems, generally receive much less research. Finally, almost no research addresses health effects for either children or adults from exposure to low dose chemicals in combination.

## School Board Accountability

Local school board members live, work, and play in or near the community. Whether elected or appointed by local government officials, they should be accountable to the local community. In some cases, school boards have been very responsive to public concern. Some have taken proactive steps to protect students, staff,

and the public at schools by limiting pesticide use or choosing not to build on contaminated land. However, many take a "politics as usual" position that blames bureaucracy to avoid accountability when things go wrong.

There are many documented cases of local school board silence about chemical contamination beneath or next to, their school. School administrators fear lawsuits from parents, teachers, and others for placing children and personnel in harm's way. School boards also dread the cost of cleaning up contamination or replacing a school.

In Marion, Ohio, for example, the school board feared lawsuits once exposure of children to chemicals buried beneath and around school property by an abandoned military depot was uncovered. School students had a higher than normal rate of leukemia and other rare cancers. The school board deferred to experts who denied any serious health risk rather than to experts who judged health risks to be too high and possibly responsible for the leukemia cluster.

Only years of community activism brought the school board to limit access to certain school-ground areas with high concentrations of contaminants ("hot spots"). However, not until the Department of Defense agreed to discuss appropriating funds to help pay for a new school would the board consider construction of a new school. In November 2000, county voters approved a bond that would provide funds to build a new school, but the new building will not be ready until 2003. Meanwhile, students remain exposed to the documented contamination.

## Brownfields and Schools

Lack of protective guidelines is of significant concern when decisions are made about whether to locate a school on what have come to be called "brownfields." The Environmental Protection Agency (EPA) describes brownfields as "abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination" (USEPA, 1995). Anyone who purchases property officially designated a brownfield is essentially free of liability for any contamination that may be found. In some cases, no environmental testing is required to so designate a site. The Los Angeles Belmont High School disaster (see Examples of Schools Built On or Near Contaminated Land) tragically depicts what can go wrong without protective guidelines and standards to direct the process.

More importantly, when these sites are redeveloped, they need only be cleaned up to standards set for commercial or industrial property. Such standards vary among states, counties, and cities but all provide less protection of human health than those required for residential property. Designation as a brownfield is essentially a promotional real estate tool to encourage businesses to purchase and redevelop areas in order to stop sprawl and bring jobs and revitalization to urban areas. Such property is not intended for siting schools, parks, or playgrounds. Brownfields typically are in densely populated urban areas, but some are also in rural locations (e.g., agricultural land, abandoned mine areas, burn dumps, abandoned lumber mills).

Brownfields are often selected as sites for new schools in urban areas because of the lack of available unused property and the need for new schools due to growing student enrollment. In many urban areas, brownfields are the only option for keeping schools in close proximity to the community served.

## Parents Are Often Kept In the Dark

Parents, teachers, and concerned citizens have a right to know about health and safety risks to children in school. Despite current right-to-know laws, parents remain in the dark concerning hazards in the school environment. Nor does the state department of environmental protection provide notice when a nearby industrial facility has been permitted to release chemicals into the environment.

When parents do request information through right-to-know or freedom-of-information laws, school districts often are unable or unwilling to produce basic information about contaminants and hazards on or near school grounds.

Few parents realize they have a right to this type of information from school districts, and few districts apprise them of it or provide information without a formal written request. Schools should offer all safety information including fire safety inspection reports, emergency management plans, asbestos reports, indoor air quality tests and evaluations, records of pesticide applications, and copies of Material Safety Data Sheets, which comprise toxicity, health, and safety information about products used in schools.

## Examples of Schools Built On or Near Contaminated Land

Hundreds of schools nationwide have been built on or near contaminated land. Taxpayers provide billions of dollars for cleanup, construction of replacement schools, and medical treatment of disease in exposed children. Either we will learn from the tragedies of past mistakes or repeat them. (Additional examples can be found in *Poisoned Schools* (CHEJ, 2001)).

### Love Canal, Niagara Falls, NY—Toxic Waste Dump

Most know of the Love Canal dumpsite in Niagara Falls, New York. Twenty thousand tons of chemicals were buried in the neighborhood's center and eventually leaked out into the surrounding community. The 99th Street Elementary School was on the perimeter of the dump, and the 93rd Street School just two blocks away. Both closed in 1978 after extensive testing revealed high levels of chemical contamination on and around them. Love Canal was the first community to close schools due to potential health risks to children.

### Los Angeles, CA—Former Oilfield and Industrial Site

The Belmont Learning Complex, dubbed America's most expensive school with its anticipated $200 million price tag, was proposed in 1985 by the Los Angeles Unified School District as a middle school to alleviate overcrowding and serve mostly Latino students from many of LA's poorest neighborhoods. The project ballooned into a proposed 35-acre, state-of-the-art, internet-connected high school campus, with a shopping mall to jump-start area commercial development, 120 affordable apartments to address housing needs, and classrooms and innovative "academies" for 5,000 students. More than ten years later, the half-built brick building stands abandoned. Parents learned what the school district already knew—explosive methane gas, poisonous hydrogen

sulfide, volatile organic compounds such as acetone, the carcinogen benzene, and residual crude oil saturated the earth where the school was being built, a former oilfield and industrial site. When construction halted, over $123 million had already been spent.

### Marion, OH—Military Dump

River Valley High School and Middle School stand on the former site of the US Army's Marion Engineering Depot, part of which served as a dumping ground in the 1950s. In 1990, community members formed a group in response to alarming rates of leukemia and rare cancers among former students. Their efforts led to an investigation that revealed widespread campus contamination. Today, no one may exit back doors of the middle school or access several playing fields. Parents want the schools closed and new facilities built in a safe area. Recently a bond issue passed to fund a new school, but students remain on the contaminated site until completion.

### Providence, RI—Two New Schools On a Dump, with More Planned

Parents brought an environmental racism lawsuit to challenge construction of an elementary school and a middle school on land used as a garbage dump for at least 25 years. Environmental testing revealed unsafe levels of lead, arsenic, and petroleum products. Eighty percent of city public school students are non-white. After a hearing, the elementary school was allowed to open and middle school construction to continue, with the condition that children remain indoors with windows and doors closed during construction.

The middle school stands completed and both schools are now operating. Parents are determined to press the lawsuit to shut down the schools, even as school officials proceed to build yet another elementary school on contaminated land, the site of a factory that burned down years ago.

### Elmira, NY—Industrial Site

Several Southside High School parents concerned about high cancer rates among students and past graduates want the school closed and relocated. Twenty-four students, five teachers, and three custodial workers have contracted cancer. A number of residents living near the school also report high cancer rates among family members. The school property is on land that has been home to several factories since 1887 and now neighbors a long-time manufacturing complex, much of which was dismantled in 1977 to construct the school. Soil testing at the time showed "relatively widespread contamination by a refined petroleum product" topped by "unsuitable" fill. Parents have been unable to confirm that a cleanup ever occurred.

The school district Health and Safety Hygienist claims "Today red flags would be flying all over the place; it's a former industrial site." The neighboring factory spent $900,000 to remove 2,000 cubic yards of contaminated soil. The NY State Department of Environmental Conservation (NYDEC) reports that petroleum tanks buried beneath the school have polluted nearby soil and a pond. Soil and air tests reveal high levels of volatile organic compounds and other carcinogenic chemicals. Nevertheless, the State Department of Health claims children are not exposed to chemical levels of concern. Despite plans to relocate children if testing reveals a problem, the school district has decided to keep the school open with athletic fields off-limits to students and the public.

These schools are only a sampling of far too many built on or near contaminated property, placing students, staff, and the public at serious health risk.

# GUIDANCE FOR ACQUIRING SCHOOL PROPERTY AND EVALUATING EXISTING SITES

The siting of schools on clean uncontaminated property is critical to providing a safe learning environment for children and a safe working environment for teachers and employees. However, no guidelines or criteria exist for where to locate schools or how to avoid environmental health risks to children and staff. Across the nation, schools located on or near contaminated land seek to define cleanup goals that protect children from harmful exposures to chemical contaminants. Schools also struggle to understand whether nearby operating industrial sites and other sources of chemical releases into the air, soil, and water pose health risks to students and staff. School boards, local government agencies, parents, and school staff need guidance to define how close a contaminated source can be to a school without being a serious health threat.

In the absence of existing guidelines or criteria, the Child Proofing Our Communities Campaign developed a process to help evaluate whether any property, including brownfields, is environmentally safe for young children and school personnel. This process begins by involving the community in the site selection process. The second step is to conduct an initial environmental assessment of the site. Depending on the result of this assessment, a more extensive evaluation may be needed. Lastly, the site may have to be remediated. This four-step process is described in detail in the campaign's *Poisoned Schools* report (CHEJ, 2001).

The campaign's School Siting Committee—which represents groups nationwide working on this issue— found that only one state—California—has taken the initiative to develop legislation and an environmental review process (CDTSC, 2000). The Committee reviewed the new California legislation and environmental review process and judges it to be progressive in scope of evaluation of proposed school sites and in government oversight. Yet it falls short in many areas, including public participation and notification, survey of surrounding school sites for potential sources of contamination, cooperative oversight by health department officials, provision for buffer zones, and child-protective standards.

## Evaluating Contamination Levels

Whether evaluating a new or an existing site for a school, it is often necessary to collect environmental data - soil, groundwater, air, or surface water samples - as part of an environmental assessment of the site. This data is used to define the extent and severity of the contamination and to determine the risks posed by any contamination found at the site.

Campaign members carefully researched what guidelines exist to evaluate or compare the results of environmental sampling. We found no health-based child-sensitive standards at the federal, state, local, or any level for determining "safe" levels of contamination in soil. Lacking such standards, parents, school districts, regulating agencies, and others are directionless as to how to evaluate contamination at new or existing sites.

Until health-based child-sensitive standards are established, the campaign has adopted an interim approach. Campaign members reviewed a number of state and federal cleanup and residential soil standards to identify those that are most protective. We found that the New York State (NYS) Soil Cleanup Objectives were generally stricter than all others. These standards consider not only the impact on human health, but also impacts on fish and groundwater quality (NYSDEC, 1994).

In the absence of a scientifically-based set of guidelines, the Child Proofing Our Communities Campaign recommends using the NYS Soil Cleanup Objectives on an interim basis. However, when a state where a school is to be located has a standard for an individual substance that is more protective of children's health than NYS standard, the more protective standard should be used. Some members of the campaign are concerned that the NYS standards are not fully protective of children. The campaign recognizes this con-

cern and calls for research to better understand the impact on children of exposure to multiple chemicals in soil and groundwater and to develop health-based child-sensitive standards.

Table 7 includes a list of chemicals that the USEPA and the Agency for Toxic Substances and Disease Registry (ATSDR) identified as the most common contaminants found at federal Superfund sites (USEPA, 1995a). The NYS Soil Cleanup Objectives for these chemicals are included. A brief description of the adverse health effects associated with these substances can be found in Appendix A. The NYS standards for additional substances are available from CHEJ or from the NYS Department of Environmental Conservation (DEC) web site (www.dec.state.ny.us/website/der/tagms/prtg4046.html). Children should not be allowed on any site with contamination above these levels.

**Table 7: New York State Recommended Soil Cleanup Objectives for Chemicals Commonly Found at Contaminated Sites**

| Solvents | | Pesticides/other | | Metals | |
|---|---|---|---|---|---|
| acetone | 0.2 | aldrin/dieldrin | 0.041 | arsenic | 7.5 |
| benzene | 0.06 | chlordane | 0.54 | barium | 300 |
| 2-butanone | 0.3 | chrysene | 0.4 | cadmium | 1 |
| carbon tetrachloride | 0.6 | DDT/DDE | 2.1 | chromium | 10 |
| chloroform | 0.3 | naphthalene | 13.0 | lead | 400 |
| 1,1-dichloroethane | 0.2 | pentachlorophenol | 1.0 | mercury | 0.1 |
| 1,2-dichloroethane | 0.1 | PCBs | 1.0 | nickel | 13 |
| methylene chloride | 0.1 | | | | |
| tetrachlorethene | 1.4 | | | | |
| trichloroethene | 0.7 | | | | |
| toluene | 1.5 | | | | |
| vinyl chloride | 0.2 | **Note:** All values are in parts per million (ppm) | | | |
| xylene | 1.2 | | | | |

# MODEL SCHOOL SITING LEGISLATION

The Child Proofing Our Communities Campaign School Siting Committee has developed a model for school siting legislation. This model draws upon the existing California legislation (CDTSC, 2000) and site evaluation process (CEPA, 1994), the New York State Soil Cleanup Objectives (NYDEC, 1994), and the original evaluation process described in the campaign's *Poisoned Schools* report (CHEJ, 2001). This model legislation can be tailored for individual state or local legislation. It is our expectation that the model will be used at various levels of government to begin the discussion of the need for such laws, laying the groundwork for protective laws in the near future.

Laws relating to the siting of schools are different in every state. Each state also has its own laws regarding cleanup of hazardous waste sites. These different laws make it difficult to draft a single piece of model legislation that could be adopted in every state. The campaign has developed this model to help local activists in developing school siting legislation (covering both public and private primary and secondary schools) that protects children's health. This model can be given to interested legislators and attorneys for use in drafting legislation on the state level. The drafters of legislation in your state will need to check their own laws to develop timetables for completing the environmental review process that is described below. Once those timetables are established, school officials can build the environmental review process into their school construction planning processes.

## 1. School Siting Committee

Usually the public body charged with siting schools is the local school board or school committee. The public body shall establish a school siting committee whose job it is to recommend to the public body sites for building new schools and/or expanding existing schools. The committee should include representatives of the public body as well as representatives from the following constituencies: parents, teachers, school health officials (nurse or health director), community members, local public health professionals, environmental advocacy groups and age appropriate students. The committee will be involved throughout the site selection process up until final approval by the public body. For siting private schools, there would be no separate School Siting Committee. However, the sponsors of the private school would still have to complete the environmental review process and notify the public about plans to site a new school.

## 2. Categorical Exclusions for School Sites

Under no circumstances shall a school be built on top of or within 1,000 feet of a hazardous waste disposal site, a garbage dump, or a site where construction and demolition materials were disposed of. To determine whether the proposed school site has been used for these purposes, a series of environmental evaluations shall be undertaken: an initial Environmental Assessment and a more extensive Preliminary Endangerment Assessment (see description of these assessments in the campaign's *Poisoned Schools* report - CHEJ, 2001). If either evaluation reveals that the site has been used for these purposes, or if the site is within 1,000 feet of any property used for these purposes, the site must be abandoned.

## 3. Process for Evaluating Sites

The public body shall not proceed to acquire the site or prepare the site for construction of any school, including the expansion of an existing school, until the public body completes the required environmental evaluations and the state environmental regulatory agency approves the initial Environmental Assessment, any required more extensive Preliminary Endangerment Assessment, or the Site Remediation Plan submitted by the public body.

### A. Environmental Assessment

Once a site is proposed, the school district must hire a licensed environmental assessor

to conduct a three-part environmental assessment that is designed to collect information on current and past site uses and to conduct initial environmental sampling at the site. This assessment shall include:

- Part I: Conduct a site history by reviewing public and private records of current and past land uses, historical aerial photographs, environmental databases, federal, state and local regulatory agencies' files; a site visit; and interviews with persons familiar with the site's history.
- Part II: Conduct a small-scale grid sampling and analysis of soil, soil gases (if any) and groundwater. Air should be sampled if stationary sources of air pollution are near the proposed site, potentially exposing children to higher levels of pollution than found in their own communities. Any surface water should also be sampled.
- Part III: Identify any environmental hazards within two miles of the site, including industrial sites, chemical storage facilities, facilities found in EPA's Toxic Release Inventory (TRI), waste treatment plants, landfills, military sites, research facilities, and Department of Energy sites.

The Environmental Assessment shall conclude that either 1) no recognized environmental hazards were identified; 2) the site was previously used for either hazardous or garbage waste disposal, for disposal of construction and demolition materials, or is within 1,000 feet of any property used for these purposes; or 3) a more extensive site assessment - a Preliminary Endangerment Assessment ("PEA") - is necessary. If no environmental hazards were identified at the property then the property is suitable for school site development. If the site was previously used for hazardous or garbage waste disposal, or for disposal of construction and demolition materials, or if it is within 1,000 feet of any property used for these purposes, the site must be abandoned.

The state environmental regulatory agency must review the Environmental Assessment. Depending on the thoroughness of the assessment, the state agency must either give preliminary approval to the assessment, disapprove the assessment, or request more information from the public body.

When the Environmental Assessment is completed and has received preliminary approval by the state environmental regulatory agency, the public body shall publish a notice in newspapers of general circulation (including foreign language newspapers if the school district has a sizable number of non-English speaking parents) that includes the following information:

- A statement that an Environmental Assessment of the site has been completed;
- A brief statement describing the results of the Environmental Assessment, such as a list of contaminants found in excess of regulatory standards, prior uses of site that might raise health and safety issues, proximity of site to environmental hazards (waste disposal sites, point sources of air pollution, etc.);
- A brief summary of the conclusions of the Environmental Assessment;
- The location where people can review a copy of the Environmental Assessment or an executive summary of the assessment written in the appropriate foreign language; and
- An announcement of a thirty-day public comment period on the Environmental Assessment, including an address where public comments should be sent.

A copy of this notice shall also be posted in a conspicuous place in every school within the public body's jurisdiction (in multiple languages if there is a significant number of non-English speaking parents). A copy shall also be delivered to each parent-teacher or-

ganization within the jurisdiction, each labor union covered by a collective bargaining agreement signed by the public body, and each landowner within 1,000 feet of the proposed site.

The state environmental regulatory agency will review the Environmental Assessment and the public comments received on the assessment. The state environmental agency will either accept or reject the conclusion of the assessment, determining whether the site can be used without further remediation or study, whether the site is categorically excluded for use as a school, or whether further study or remediation of the site (i.e., a Preliminary Endangerment Assessment) is required. The state environmental agency shall explain in detail the reasons for accepting or rejecting the assessment.

B. Preliminary Endangerment Assessment

After the state environmental agency has approved the Environmental Assessment, the local School Siting Committee must also review the assessment and public comments received. The purpose of this review is for the School Siting Committee to make a recommendation to either abandon the site or continue evaluating the environmental hazards at the site with a PEA. A PEA is required if environmental hazards were identified in the Environmental Assessment or:

1. If the environmental sampling data collected as part of the Environmental Assessment indicate that contamination levels exceed regulatory safety standards such as the New York State Recommended Soil Cleanup Objectives (See Appendix A), or

2. If a proposed school site lies within 1,000 feet of one of the following potential sources of contamination:

- A suspected hazardous, industrial waste, or municipal waste disposal site
- Refineries, mines, scrap yards, factories, dry cleaning, chemical spills, and other contaminants
- Agricultural land
- Dust generators such as fertilizer, cement plants, or saw mills
- Leaked gasoline or other products from underground storage tanks
- Concentrated electrical magnetic fields from high intensity power lines and communication towers
- Areas of high concentrations of vehicular traffic such as freeways, highways, an airport, or a bus depot
- Industrial plants and facilities
- An USEPA or state designated Brownfield site
- A railroad bed
- An industry listed in EPA Toxic Release Inventory (TRI)

If a PEA is required, the School Siting Committee should recommend to the public body whether to abandon the site or proceed with a PEA. Then, the public body must vote whether to abandon the site or proceed with a PEA.

If a PEA is to be conducted, the public body must hire a licensed environmental assessor. The state environmental regulatory agency shall oversee the PEA process and issue regulations that prescribe the precise contents of the PEA. A model for such regulations can be found in California, where the PEA must meet the California Department of Toxic Substances Control Preliminary Environmental Assessment Guidance Manual requirements (CEPA, 1994). The PEA must also be approved by the state environmental regulatory agency.

Before any work is done on the PEA, the public body must develop a public participation plan that addresses the public participation activities that will be undertaken as part of the PEA process. The plan shall indicate what mechanisms the public body will use to establish open lines of communication with the public about the use of the site as a school. Activities such as public meetings, workshops or fact-sheets may be appropriate

ways to notify the public about the proposed PEA investigation activities (such as the taking of soil, groundwater and air samples) and schedules. The State Environmental Regulatory Agency must approve the public participation plan before the public body can commence other PEA-related activities.

The primary objective of the PEA is to determine if there has been a release or if there is a potential for a release of a hazardous substance that could pose a health threat to children, staff, or community members. As part of the PEA, full-scale grid sampling and analysis of soil, soil gases (if any) and groundwater shall be undertaken to accurately quantify the type and extent of hazardous material contamination present on the site. The PEA will also contain an evaluation of the risks of actual or potential contamination posed to children's health, public health, or the environment based on the contamination found. The evaluation of risks shall include:

- A description of health consequences of long-term exposure to any hazardous substances found on site;
- A description of all possible pathways of exposure to those substances by children attending school on site; and
- The identification of which pathways would more likely result in children being exposed to those substances.

The PEA shall conclude that 1) there are no environmental hazards at the site which must be abated through a clean up plan; or 2) the site was previously used for hazardous or garbage waste disposal, for the disposal of construction and demolition materials, or is within 1,000 feet of any property used for these purposes, or 3) the site must be cleaned up if the site is to be used for a school. If the site was previously used for hazardous or garbage waste disposal, for the disposal of construction and demolition materials, or is within 1,000 feet of any property used for these purposes, the site must be abandoned.

If the site must be cleaned up, the PEA shall identify alternatives for cleaning the site to meet the applicable safety standards.

The state environmental regulatory agency must review the PEA. Depending on the thoroughness of the assessment, the state agency must either give preliminary approval to the assessment, disapprove the assessment, or request more information from the public body.

When the PEA is completed and has received preliminary approval by the state environmental regulatory agency, the public body shall publish a notice in newspapers of general circulation (including foreign language newspapers if the school district has a sizable number of non-English speaking parents) that includes the following information:

- A statement that a PEA of the site has been completed;
- A brief statement describing the results of the PEA, such as a list of contaminants found in excess of regulatory standards, prior uses of site that might raise health and safety issues, proximity of site to environmental hazards (waste disposal sites, point sources of air pollution, etc.);
- A brief summary of the conclusions of the PEA, including a list of alternative clean up methods;
- The location where people can review a copy of the PEA or an executive summary of the PEA written in the appropriate foreign language; and
- An announcement of a thirty-day public comment period, including an address where public comments should be sent.

A copy of this notice shall also be posted in a conspicuous place in every school within the public body's jurisdiction (in multiple languages if there is a significant number of non-English speaking parents). A copy shall

also be delivered to each parent-teacher organization within the jurisdiction, each labor union covered by a collective bargaining agreement signed by the public body, and each landowner within 1,000 feet of the proposed site.

The state environmental regulatory agency will review the PEA and the public comments received on the PEA. The state environmental agency shall either accept or reject the conclusion of the PEA, determining whether the site can be used without further remediation or study, whether the site is categorically excluded for use as a school, or whether a Site Remediation Plan is required. The state environmental agency shall explain in detail the reasons for accepting or rejecting the PEA.

C. Site Remediation Plan

If the PEA indicates that the site has a significant hazardous materials contamination problem, the public body must either abandon the site or fund a cleanup plan that would reduce contaminant levels to the applicable safety standard for each contaminant. The public body must abandon the site if the site was previously used for hazardous or garbage waste disposal, for disposal of construction and demolition materials, or is within 1,000 feet of any property used for these purposes.

Regarding safety standards for exposures to contaminants, the campaign found no health-based child-sensitive standards at the federal, state, local, or any level for determining "safe" levels of contamination in soil. Lacking such standards, parents, school districts, regulating agencies, and others are directionless as to how to evaluate contamination at new or existing sites. As an interim measure, the campaign recommends the use of the New York State (NYS) Recommended Soil Cleanup Objectives. Campaign members reviewed the cleanup standards or guidelines for several states and found the NYS standards to be generally stricter than all others considered. New York's standards consider not only human health risk, but also risk to fish and groundwater (NYDEC, 1994). However, when a state where the school is located has a standard for an individual substance that is more protective than New York State's, the more protective standard should be used. The NYS Soil Cleanup standards for common contaminants is included in Appendix A along with a table that briefly describes the adverse health effects associated with exposure to these substances.

If the PEA approved by the state environmental regulatory agency determines that site remediation is necessary, the School Siting Committee should recommend to the public body whether to abandon the site or proceed with the development of a remediation plan. Then, the public body must vote whether to abandon the site or proceed with developing a remediation plan.

If the public body chooses to prepare a Site Remediation Plan, the plan must:

- Identify alternative methods for cleaning the site to contamination levels that meet the applicable safety standards;
- Contain a financial analysis that estimates and compares soil cleanup costs for the identified alternative cleanup methods that will bring the site into compliance with applicable safety standards;
- Recommend a cleanup plan from the alternatives identified;
- Explain how the recommended cleanup alternative will prevent children from being exposed to the hazardous substances found at the site; and
- Evaluate the suitability of the site in light of recommended alternative sites and alternative cleanup plans.

The public body shall submit the Site Remediation Plan to the state environmental regulatory agency for approval. Before submitting the plan for approval, a draft remediation plan shall be given to the School Siting Committee for review and comment. Once the remediation plan is submitted to the state

agency for approval the public body shall publish a notice in newspapers of general circulation (including foreign language newspapers if the school district has a sizable number of non-English speaking parents) that includes the following information:

- A statement that a site remediation plan has been submitted to the state environmental agency for approval;
- A brief statement describing the site remediation plan, including a list of contaminants found in excess of regulatory standards and a description of how the plan will reduce the level of contamination to meet those regulatory standards;
- The location where people can review a copy of the remediation plan or an executive summary of the remediation plan written in the appropriate foreign language; and
- An announcement of a thirty-day public comment period and the address of the state environmental agency where public comments should be sent.

A copy of this notice shall also be posted in a conspicuous place in every school within the public body's jurisdiction (in multiple languages if there is a significant number of non-English speaking parents). A copy shall also be delivered to each Parent-Teacher Organization within the jurisdiction, to each labor union covered by a collective bargaining agreement signed by the public body, and each landowner within 1,000 feet of the proposed site.

At least thirty days after the conclusion of the public comment period the state environmental regulatory agency shall conduct a public hearing on the remediation plan in the neighborhood or jurisdiction where the proposed site is located. The state environmental agency shall publish a notice of the hearing in newspapers of general circulation (including foreign language newspapers if the School district has a sizable number of non-English speaking parents) stating the date, time and location of the hearing. The state environmental regulatory agency shall provide translators at the public hearing if the school district has a sizable number of non-English speaking parents.

After the public hearing and after reviewing any comments received during the public comment period the state environmental regulatory agency shall either approve the Site Remediation Plan, disapprove the Site Remediation Plan, or request additional information from the public body. If the state agency requires additional information, a copy of the letter requesting additional information shall be sent to the School Siting Committee. Any additional information submitted by the public body to the state environmental regulatory agency shall also be given to the School Siting Committee. After reviewing any additional information, the state environmental regulatory agency must approve or reject the Site Remediation Plan. The state environmental agency shall explain in detail the reasons for accepting or rejecting the Site Remediation Plan.

Once the state environmental regulatory agency approves the Site Remediation Plan, the School Siting Committee should recommend to the public body whether to abandon the site or proceed with acquiring the site and implementing the remediation plan. Then, the public body must vote whether to abandon the site or to acquire the site and implement the remediation plan. Only upon voting to acquire the site and implement the remediation plan may the public body take any action to acquire the site and prepare the site for construction of a school.

# ACTION STEPS FOR PARENTS AND COMMUNITY REPRESENTATIVES

**New School Construction:**

- ✔ Check to see if new school construction is planned within the next five years in your school district. You can make this inquiry at the local school board, county/city offices or with your state department of education.

- ✔ Take the model legislation to your local decision-making body, usually the school board for your district, and ask them to officially adopt the policies.

- ✔ Take the model legislation to your state-level elected representatives and ask that they introduce the legislation as law for your state. Even if you don't have a new school proposed for your district, you should ask your state legislators to consider the model legislation for adoption. This will ensure future schools are built safely and will support other parents faced with a proposal for building near a contaminated site.

**Schools Located on or within a Half-mile of a Known Toxic Waste Site:**

- ✔ Don't panic. The fact that your school is within a half-mile of a known toxic site doesn't mean that your child is endangered. What it does mean is that you should check to see if a danger is present.

- ✔ Drive around the contaminated site and see where it actually is, if you don't already know. How close is the site to where your child walks to and from school each day?

- ✔ Contact the city or county department of environment and ask them where you can find information on the site. Check to see what was beneath the land that your local school is built on. Often this information is located at a local library. You can also contact CHEJ or a local environmental group to help you decipher the information and its potential threats, if any.

Whether you are concerned about new school construction or about a school located near a toxic site, please consider joining the Childproofing Our Communities Campaign's Siting Committee. The committees work across the country with parents, teachers, administrators, and health professionals to educate and eliminate the construction of schools on contaminated land and to clean up existing contaminated school properties. The committee meets via conference calls once a month for an hour.

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# Appendix A

**Table A-1: New York State Recommended Soil Cleanup Objectives for Chemicals Commonly Found at Contaminated Sites**

**All values are in parts per million (ppm)**

| Solvents | | Pesticides/other | | Metals | |
|---|---|---|---|---|---|
| Acetone | 0.2 | Aldrin/Dieldrin | 0.041 | Arsenic | 7.5 |
| Benzene | 0.06 | Chlordane | 0.54 | Barium | 300 |
| 2-Butanone | 0.3 | Chrysene | 0.4 | Cadmium | 1 |
| Carbon Tetrachloride | 0.6 | DDT/DDE | 2.1 | Chromium | 10 |
| Chloroform | 0.3 | Naphthalene | 13.0 | Lead | 400 |
| 1,1-Dichloroethane | 0.2 | Pentachlorophenol | 1.0 | Mercury | 0.1 |
| 1,2-Dichloroethane | 0.1 | PCBs | 1.0 | Nickel | 13 |
| Methylene Chloride | 0.1 | | | | |
| Tetrachlorethene | 1.4 | | | | |
| Trichloroethene | 0.7 | | | | |
| Toluene | 1.5 | | | | |
| Vinyl Chloride | 0.2 | | | | |
| Xylenes | 1.2 | | | | |

**Source:** New York State Department of Environmental Conservation

**Table A-2 : Adverse Health Effects Associated With Chemicals Commonly Found at Contaminated Sites**

| Substance | Adverse Health Effects |
|---|---|
| **Solvents** | |
| Acetone | Liver, kidney, nervous system damage; reproductive effects |
| Benzene | Nervous system, immune and blood damage; reproductive effects; leukemia |
| 2-Butanone | Nervous system damage |
| Carbon Tetrachloride | Liver, kidney, nervous system damage; liver cancer |
| Chloroform | Liver, kidney; nervous system damage; reproductive effects; liver, kidney cancer |
| 1,1-Dichloroethane | Kidney, heart damage; liver cancer |
| 1,2-Dichloroethane | Kidney, liver, lung, heart, and nervous system damage; cancer of the colon and rectum |
| Methylene Chloride | Nervous system damage; skin rashes; liver cancer |
| Tetrachloroethene | Nervous system, reproductive, liver, kidney damage; liver and kidney cancer |
| Trichloroethene | Nervous system, liver, kidney, immune, heart damage; skin rashes, reproductive effects*; liver, lung cancer and possibly leukemia [TP] |
| Toluene | Nervous system, kidney damage; reproductive effects* |
| Vinyl Chloride | Nervous system, liver, immune damage; reproductive effects; liver cancer |
| Xylene | Liver, lung, nervous system damage; reproductive effects * |

| Substance | Adverse Health Effects |
|---|---|
| **Solvents** | |
| **Pesticides/other** | |
| Pentachlorophenol | Liver, kidney, immune, lung, blood, nervous system damage; liver and adrenal cancer |
| Aldrin/Dieldrin | Kidney and nervous system damage; liver cancer[TP] |
| Chlordane | Nervous system, digestive, liver damage; liver cancer |
| Chrysene | Skin cancer [TP] |
| DDT/DDE | Liver, nervous system damage; reproductive effects*; liver cancer |
| Naphthalene | Red blood cell, lung damage |
| PCBs | Skin disorders; liver damage; developmental and behavioral effects; reproductive effects; liver, biliary tract cancer |
| **Metals** | |
| *Arsenic* | *Skin disorders; lung, heart, blood damage; birth defects and other reproductive effects*; skin, bladder, lung, kidney, liver, prostate cancer* |
| Barium | Circulatory system effects; heart, liver, kidney damage |
| Cadmium | Kidney, lung damage; birth defects and other reproductive effects*; lung cancer |
| Chromium | Kidney, liver damage; skin disorders; lung cancer |
| Lead | Kidney, immune damage; neurological damage leading to developmental effects – learning disabilities and reduced growth; cancer |
| Mercury | Permanent kidney and brain damage; birth defects and other reproductive effects*; neurological damage leading to developmental effects |
| Nickel | Kidney, liver, lung damage; allergic reactions; lung cancer |

Sources:

The primary source used to prepare this table is the Agency for Toxic Substances and Disease Registry (ATSDR) Division of Toxicology ToxFAQs. These fact sheets are available on the web at http://www.atsdr.cdc.gov/toxfaq.html. Some information was obtained from the full Toxicity Profile (TP) for a substance. Reproductive effects (*) are supplemented from *Generations at Risk, Reproductive Health and the Environment*, Schettler, T., Solomon, G., Valenti, M., and Huddler, A., MIT Press, Cambridge, MA, 1999.

# Appendix B

## METHODOLOGY

### How the Maps Were Generated

The maps showing the location and number of public schools within one half mile of a federal Superfund or a state-identified contaminated site were prepared by the Citizens' Environmental Coalition in Albany, NY. The process used to generate the maps is briefly summarized below.

#### Public Schools in the US

Public schools were identified from the Common Core of Data (CCD) database maintained by the US Department of Education. CCD is the US Department of Education's primary database on elementary and secondary education in the US. This database provides an official listing of public elementary and secondary schools and school districts in the nation and includes basic information and descriptive statistics on all public schools. Data are collected annually from approximately 90,000 public elementary and secondary schools and from approximately 16,000 school districts from the 50 states, the District of Columbia, and outlying areas (USDE, 2001), including Department of Defense schools. Information on public schools in California, Massachusetts, Michigan, and New Jersey were obtained from this database. For New York, information on public schools was obtained from a database maintained by the New York State Education Department (NYED, 2001).

#### Federal Superfund and State-Identified Contaminated Sites

Several different sources were considered for identifying contaminated sites that could possibly pose a threat to school-aged children. The federal Superfund or National Priorities List (NPL) sites and state-identified contaminated sites were chosen.

1) The federal NPL sites were obtained for four states – California, Massachusetts, Michigan, and New Jersey— from the USEPA Superfund website at map3.epa.gov/enviromapper/index.html.

2) Research was conducted to determine if these states maintain lists of contaminated sites other than the federal Superfund sites. Other lists were obtained for the states of MA, MI, and NY.

The state of Massachusetts Department of Environmental Protection (DEP) maintains a list of Tier Classified Oil or Hazardous Material Sites. These sites are kept in a statewide database that contains the "approximate location of oil or hazardous material disposal sites that have been (1) reported and (2) Tier Classified under M.G.L. Chapter 21 E and Massachusetts Contingency Plans (MCP)" (MADEP, 2001). This database includes state-identified contaminated sites and leaking underground storage tanks. A total of 2,167 sites were identified from this list. This database is available at the MADEP website at www.state.ma.us/mgis/c21e.htm.

The state of New York Department of Environmental Conservation (NYDEC) maintains a list of Inactive Hazardous Waste Sites. This list includes the federal Superfund sites as well as other contaminated sites. These sites are divided into six classes based on their threat to public health. Class1, 2, and 3 sites were included in this assessment. Class 1 sites pose an "imminent danger to the environment or public health;" Class 2 sites pose a "significant threat to the public health or the environment; " and Class 3 sites are known to contain hazardous waste, though they are not considered to pose "significant threats to the environment or public health" (NYDEC, 2001). A total of 612 sites were identified from this list. This database is available at the NYDEC website at http://www.nysgis.state.ny.us/gis3/data/nysdec.hazwaste.html.

The state of Michigan Department of Natural Resources (DNR) maintains a list of contaminated sites identified as "Part 201" sites. This list includes the federal Superfund sites as well as other contaminated sites where there has been a "release of a hazardous substance, or the potential release of a discarded hazardous substance, in a quantity which is or may become injurious to the environment or to the public health, safety, or welfare" (MIDEQ, 2001). The Michigan DNR classifies each site using a Site Assessment Model to generate a numerical risk assessment score. A score of 40 or greater (out of a possible score of 48) indicates contamination of the highest rank (MIDNR, 2001). Sites with a score of 40 were used in this assessment. A total of 112 sites were identified by this process. The databases used to generate this list can be found at www.midnr.com/spatialdatalibrary/sdl/Contamination_Site_Map_Layers_Final.htm and www.deq.state.mi.us/erd1/sites/index.jsp.

For the states of California and New Jersey, only the NPL sites were used. In California, 110 sites were identified and in New Jersey, 119 sites were identified. This data is available from the USEPA Superfund website at map3.epa.gov/enviromapper/index.html.

### Identifying Public Schools Within One Half-Mile of a Federal Superfund or State Identified Contaminated Site

The location and number of schools located within one half mile of a federal Superfund or a state identified contaminated site in the states of California, Massachusetts, Michigan, and New Jersey were determined by using an address matching program for ArcView called StreetMap. ArcView 3.2 with StreetMap 1.1 was used. Schools were first geocoded with StreetMap and then a query was run using ArcView to find the schools that are within one half mile of the sites. Schools whose addresses did not match through this program were assigned geographic locations through several additional steps: 1) matching to 1995 census street addresses data; 2) eliminating schools not within zip codes which were within half a mile of a federal Superfund or state identified contaminated site; 3) locating the addresses manually using MapQuest; and 4) manually searching within a half mile radius of federal Superfund and state identified contaminated sites for the streets unmatched schools are located on.

The location and number of schools located within one half mile of a federal Superfund site or a state identified contaminated site in the state of New York were determined by a slightly different process. For New York, databases were available that identified the longitude and latitude for the state superfund sites (NYDEC, 2001) and for the public school locations (NYDE, 2001). The longitude and latitude "layers" were overlaid using ArcView and a query was run to find any schools that were within half a mile of the Superfund sites.

**For more information contact:**

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